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Effect of Soaking and Concentration of Liquid Organic Fertilizer (POC) Cow Urine Against Early Grape Cuttings (Vitis Vinevera. L).

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ABSTRACT

use of vine stem cuttings seeds has the advantage of providing more number of seeds and later new plants which will have properties such as the parent, grapes are already known as one of the classy fruits in the world, both fresh consumed and processed products, processed grape products which is known as wine is able to penetrate the price of Rp5.7 billion per bottle is famously expensive in subtropical countries. This study aims to determine the duration of soaking and concentration of liquid organic fertilizer (POC) of cow urine on the initial growth of grape cuttings. The study was conducted in the Experimental Garden Faculty of Agriculture, Merdeka University, Surabaya Jl. Ketintang Madya VII / 2 Surabaya, with a height of ± 5 meters above sea level. This study uses a randomized block design (RBD) arranged according to factorial patterns with two (2) factors, namely factor I = duration of immersion consisting of 4 levels, including: L0 = 0 minutes (control), L1 = cuttings of grapes soaked for 15 minute, L2 = cuttings of grapes soaked for 30 minutes, L3 = cuttings of grapes soaked for 45 minutes, while factor II = concentration of organic ZPT consists of 3 levels, including P0: 0 ml / liter (water), P1: 10 ml cow urine per liter of water, P2: 20 ml cow urine per liter of water, P3: 30 ml cow urine per liter of water, P4: 40 ml cow urine per liter of water, based on the results of the study, conclusions can be drawn. There was a significant interaction at the F5% test level on the variables studied, namely the length of the vine cuttings at 42 days after planting and was best achieved by a combination of P3L2 treatment compared to other treatments, although it was not significantly different from the combination of P2L3 and P4L2 treatments. significant from both the POC concentration factor and the immersion length factor under study, mainly in the shoot length variable at 42 days after planting. Statistically, a better value for all of these variables is achieved by the P3 treatment that is 30% ml / liter of water and the L2 treatment that is 30 minutes.

Keywords: Cow Urine POC, Wine Cuttings

1. INTRODUCTION

Grapes have existed in Indonesia since the Dutch colonial era and were first planted on Banana Island (Sumabar), then spread them throughout the archipelago. In 1828, grapes began to be cultivated in the regions of Kupang, Sulawesi, Besuki and Banyuwangi. Some grape varieties in Indonesia include Black Alicante, Golden Champion, Muscat Van Alexanrie (Probolinggo Putih), Frankenthaler (Probolinggo Biru), Isabella, Gross Colman, and Aphoso Lavale (Bali) (Emi Budiyati, 2015).

Vegetative propagation can be done by means of shoot grafting (shoot grafting) to replace the root system of other grape species that are stronger and more resistant to environmental stress by

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connecting superior species of grapes (as the stem) to other species of wine (as rootstock), usually taking rootstock through cuttings (Mujiman M Rebin, 2011).

To improve the quality of grapes efficiently it is necessary to use alternative technologies so that the profits of the grape farming increase by using growth regulators (PGR) are complex organic compounds that affect plants and plant growth regulators (PGR) there are eight hormone groups, between others: auxin, gibberllins, cytokinins, abscisic acid, ethylene brasinosteroid, salicylates, jasmonate (Sri Setya Harjadi, 2009).

The discovery of these hormones is the most interesting part is the effort to purify human urine in several steps, each step, the results of which are tested for biological activity by the test of curvature of the avena. In 1931, kogl and haagen-smit purified 33 gallons of urine to obtain 40mg of a compound they called auxin A, they further purified human urine and found a compound whose structure and activity were similar to auxin A, the compound was later called auxin B, in addition to that in the extract also contained a compound known as indol-3-acetic acid IAA = indole-3-acetic acid (Sri Setyati Harjadi, 2009).

Liquid organic fertilizer (POC) is a solution from the decay of organic materials derived from plant residues, animal waste, and humans (Ali, Purwanti, & Hidayati, 2019). The advantages of organic fertilizer can quickly overcome nutrient deficiencies, have no problem in washing nutrients and are able to provide nutrients quickly. Liquid organic fertilizer (POC) derived from livestock urine, such as cow urine contains macro nutrients, including; Nitrogen 0.52, phosphorus 0.01, potassium 0.56, calcium 0.007 (Hadisuwito Sukamto, 2007).

While the animal urine can be used as a natural growth regulator for plants because cow urine contains growth regulators namely auxin and giberlin. This hormone comes from food eaten by cows. In his research Budiharjo et al (2003) concluded that soaking wine cuttings in cow urine concentrations of 20% can provide optimal results on the number of leaves, the number of shoots and the length of shoots of grapes, while according to the journal ZIRA'AH (2014) seen from the research data the long treatment The best soaking of cow urine for the speed at which buds appear on cuttings is 15 minutes.

2. RESEARCH METHODS

This study uses a randomized block design (RCBD) arranged according to factorial patterns with 2 (two) factors, namely: F1: Immersion time consists of 4 levels, L0: 0 minutes (control). L1: Grape cuttings soaked for 15 minutes. L2: Grape cuttings soaked for 30 minutes. L3: Grape cuttings soaked for 45 minutes, F2: Organic ZPT concentrations consist of 5 levels, P0: 0% (water) and P1: 10% cow urine P2: 20% cow urine P3: 30% cow urine P4: 40% cow urine. From these two factors, 20

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treatment combinations were obtained, which were then repeated 3 times, so that 60 treatment combinations were obtained, each treatment was planted with two sample plants.

3. RESULTS AND DISCUSSION

Germination Speed

The results of statistical analysis showed that there was no significant interaction between the concentration factor of liquid organic fertilizer (POC) with immersion time on the variable growth rate of vine cuttings. However, separately the treatment concentration of liquid organic fertilizer (POC) gave a very significant effect on budding speed after planting.

Table 1. Average Speed of Growth of Grape Cuttings (days) in Various Treatments

Treatment	Average Speed of Growth of Grape Cuttings (Days)
P0	9,63 b
P1	9,25 b
P2	8,21 a
P3	9,54 b
P4	8,38 a
BN	0,86
L0	8,97 ab
L1	9,47 b
L2	8,20 a
L3	9,37 b
BNT 5%	0,77

Note: The numbers are accompanied by the same letter, in thecolumn sameshowed no significant difference (LSD 5%).

In table 1 above shows that in the concentration factor there is a tendency of P0 treatment to give the highest value of 9.63 compared to other treatments, while the immersion duration factor there is a tendency for L1 treatment to give the highest value of 9.47 compared to other treatments on observations of 42-day-old plants after planting.

According to Lakitan (1996), that the cytokinin hormone is transported acropetally through the xylem to the top of the plant, the cytokinin will stimulate cell division in plants and the dividing cells will develop into buds.

Shoot Length The

results of statistical analysis showed that there was no significant interaction between the concentration factor of liquid organic fertilizer (POC) and soaking time on the variable length of shoots of grape cuttings. However, separately treating the concentration of liquid organic fertilizer (POC) had a very significant influence on the length of shoots at 42 days after planting (HST), while the soaking time treatment also had a significant effect on the length of shoots at 42 days after

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planting (Appendix 1). The average length of the vine shoots at various age observations, is presented in table 2. In table 2 shows that the combination of P3L2 treatment gives the highest value of 16.17 cm compared with other treatments although it is not significantly different from the combination of P2L3 and P4L2 treatments respectively 14.47 cm and 13.70 cm respectively. This explains that the POC concentration of 30% with a soaking time of 30 minutes gives a better effect compared to other treatments.

Table 2. Average length of vine stem cuttings (cm) at various observational ages (days after planting).

treatment	Averageof shoot length (cm)			
	21	28	35	42
P0L0	1,62	2,03 a	4,40 a	8,77 a
P0L1	1,50	4,27 a	8,03 a	10,70 a
P0L2	1,87	6,23 bc	9,47 b	11,40 b
P0L3	1,95	5,47 b	11,33 bc	12,60 bc
P1L0	2,00	6,43 bc	8,43 a	10,60 a
P1L1	2,58	5,77 b	10,23 bc	12,27 bc
P1L2	2,28	6,90 bc	11,37 bc	13,23 bc
P1L3	1,17	3,33 a	5,07 a	6,90 a
P2L0	2,05	5,53 b	9,13 b	11,50 b
P2L1	2,12	4,03 a	6,90 a	8,17 a
P2L2	2,18	5,60 b	11,63 bc	13,33 bc
P2L3	2,77	6,90 bc	12,17 bc	14,47 bc
P3L0	1,67	3,07 a	4,87 a	9,70 a
P3L1	1,50	4,80 b	8,47 a	10,57 a
P3L2	1,58	8,67 c	13,97 c	16,17 c
P3L3	1,68	5,97 b	9,57 b	13,00 bc
P4L0	2,43	5,50 b	8,67 b	11,67 b
P4L1	2,23	6,07 bc	8,67 b	11,03 b
P4L2	2,74	8,43 c	11,77 bc	13,70 bc
P4L3	2,67	7,57 c	10,87 bc	12,80 bc
BNT 5 %	tn	2,60	4,10	4,05

Description: Numbers- the numbers next to the same letter, in thecolumn sameshow no significant difference (LSD 5%).

According to Gunawan, *et al*. (2017) that based on the results of laboratory tests from the Research and Consultation Center for Industry prove that this liquid organic liquid of cow urine contains macro elements such as Organic C 1,460%; Nitrogen 0.098%; P2O5 0.102%; K2O 0.216%; Ca 166.52 ppm; Mg 104.61 ppm or micro elements, including: Co 2.15 ppm; Al 2.88 ppm; Fe 0.13 ppm; Na 1.28 ppm; Ni 0.21 ppm; Zn 0.23 ppm; B 1,13 ppm; Mn 0.012 ppm There are also several hormones, namely IAA 8.61 ppm; cytokines 5.16 ppm; gibrerillin 2.54 ppm and bacterial content,

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such as: pospat solvent bacteria, *lactobacillus*, actinomycetes and photosynthetic bacteria. This organic liquid fertilizer has a lot of elemental content and is able to overcome nutrient definitions quickly or provide nutrients quickly.

Number of Leaves

The results of statistical analysis showed that there was no significant interaction between the concentration factor of liquid organic fertilizer (POC) and soaking time on the variable number of leaves of cuttings of grapes. Although separately both the treatment of liquid organic fertilizer concentration (POC) and the soaking time treatment also did not have a significant effect on the number of leaves at the age of observation 42 days after planting cuttings of grapes.

In table 3 below shows that the POC concentration factor there is a tendency for P4 treatment to give the highest value of 5.38 compared to other treatments, while the immersion time factor there is a tendency for L2 treatment to give the highest value of 5.53 compared to other treatments at observations of 42-day-old plants after planting. The average number of leaves of cuttings of grapes at the end of the observation is presented in Table 3.

The leaf organ is the dominant place for the process of plant photosynthesis, where the results of this photosynthate have an important role in the growth and formation of plant biomass. Furthermore, the opinion of Gardner et.al (1991) that the number of leaves affects the results of photosynthesis, where the leaves allow to capture light to the maximum to meet the needs of photosynthesis, because the leaves contain chlorophyll and several other pigments.

Table 3. Average Number of Grape Cuttings Leaves at Different Age Observations (Days After Planting).

Treatment	of the Average Number of Leaf Buds (strands)			
	21	28	35	42
P0	1,50	2,42	3,83	4,33 a
P1	1,58	2,33	3,75	4,25 a
P2	1,50	2,58	4,00	5,33 b
P3	1,17	2,38	4,00	4,83 ab
P4	1,75	2,75	4,04	5,38 b
BNT 5%	tn	tn	tn	0,93
L0	1,53	2,13 a	3,37 a	4,30 a
L1	1,27	2,37 ab	3,67 a	4,50 a
L2	1,63	2,83 b	4,53 b	5,53 b
L3	1,57	2,63 ab	4,13 b	4,97 ab
BNT 5%	tn	0,52	0,70	0,83

Note: The numbers next to the same letter in the same column show no significant difference (BNT 5%).

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Bud Diameter and Number of Buds a. Bud diameter

The results of statistical analysis showed that there was no significant interaction between the concentration factor of liquid organic fertilizer (POC) and the immersion time on the variable diameter of the vine stem cuttings. But separately both the concentration factor of liquid organic fertilizer (POC) and soaking time did not have a significant effect on the shoot diameter variable at the age of observation 42 days after planting. The average shoot diameter of the vine at the end of the observation, is presented in table 4.

Table 4. The average diameter of stem shoots and the number of shoots of cuttings at the end of observation.

Treatment	Final Observation(42 Days After Planting)	
	Diameter (mm)	Number of Buds
P0	3,37	1,04
P1	3,39	1,13
P2	3,07	1,21
P3	3,54	1,25
P4	3,17	1,46
BNT 5%	tn	tn
L0	3,27	1,17
L1	3,14	1,20
L2	3,43	1,27
L3	3,39	1,23
BNT 5%	tn	tn

Description: The numbers are accompanied by the same letter, in thecolumn, sameshowed no significant difference (LSD 5%).

In table 4 above it shows that both POC concentration factors have a P3 tendency of 3.54 compared to other concentrations; while soaking time there is a tendency of L3 treatment of 3.43 compared to other treatments on observations of plants aged 42 days after planting. Application of organic fertilizer in the soil affects the chemical and biological (biological) properties of the soil. Important chemical and biological functions include ion exchange and chemical buffering, as N, P, and S nutrient stores, phosphate dissolution by complexing Fe and Al ions in the soil and as a source of energy for soil microorganisms (Notohadiprawiro, 1998).

Number of shoots

Statistical analysis showed that there was no significant interaction between the concentration factor of liquid organic fertilizer (POC) and soaking time on the variable number of shoots of grape cuttings. Although separately both in the treatment of liquid organic fertilizer concentration (POC) and soaking time did not have a significant effect on the number of shoots at all age observations of vine cuttings.

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In table 4 above it shows that both the POC concentration factor has a tendency of P4 of 1.46 compared to other concentrations; while soaking time there is a tendency of 1.22 L2 treatment compared to other treatments on observations of plants aged 42 days after planting. The average number of shoots of grape cuttings is presented in table 4 above.

According to Simanungkalit, RDM *et al*. (2006), that organic fertilizer / organic material has chemical functions such as: (1) supply of macro nutrients (N, P, K, Ca, Mg, and S) and micro, such as Zn, Cu, Mo, Co, B, Mn, and Fe) although in relatively small amounts. (2) increase land cation measurement capacity (CEC); and (3) can form complex compounds with metal ions that poison plants such as Al, Fe, and Mn.

Root Length and Number of Roots a. Root length

The results of statistical analysis showed that there was no significant interaction between the concentration factor of liquid organic fertilizer (POC) and soaking time on the variable root length of cuttings of grapes. Although separately both in the treatment of liquid organic fertilizer concentration (POC) and soaking time did not have a significant effect on root length at 42 days after planting cuttings of grapes (attachment). The average root length of the vine at the end of the observation is presented in table 5 below.

Table 5. Average Root Length (cm) and Number of Grapes at Observation Age 42 Days After Planting.

Treatment	Final Observation(42 Days After Planting)	
	Root length (cm)	Total Root
P0	7,13	7,38
P1	8,91	8,21
P2	7,83	9,29
P3	8,17	9,46
P4	7,77	9,58
BNT 5%	tn	tn
L0	8,55	8,33
L1	8,10	8,43
L2	7,29	9,43
L3	7,91	8,93
BNT 5%	tn	tn

Description: the figures are accompanied by the same letters, in thecolumn, sameshowed no significant difference (LSD 5%).

In table 5 above it shows that both the POC concentration factor has a P1 tendency of 8.91 compared to other concentrations; while soaking time there is a tendency of L0 treatment of 8.55 compared to other treatments on observations of plants aged 42 days after planting. According to the research of Sudrajad and Widodo (2011), states that the response of growth regulators is closely

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related to the right concentration will be able to regulate the physiological processes of plants so that it stimulates the growth of the roots of grapes, and if the concentration is too high it will inhibit growth.

Number of roots

The results of statistical analysis showed that there was no significant interaction between the concentration factor of liquid organic fertilizer (POC) and soaking time on the variable number of root cuttings of grapes. Although separately both the treatment of liquid organic fertilizer concentration (POC) and soaking time did not have a significant effect on the number of roots at 42 days after planting cuttings of grapes. The average root length of the vine at the end of the observation is presented in table 5 above.

In table 5 above it shows that both the POC concentration factor has a tendency of P4 of 9.58 compared to other concentrations; while the soaking time there was a tendency of L2 treatment of 9.43 compared to other treatments on observations of plants aged 42 days after planting. Lakitan (1996) *in* Hafizah (2014), states that cell growth and development depends on the supply of nutrients in the soil for metabolism and protein synthesis, causing an increase in the number of roots.

4. CONCLUSION

Based on the results of the study There was a significant interaction on the F5% test level on the variable studied, the length of the vine cuttings at 42 days after planting and was best achieved by a combination of P3L2 treatment compared with other treatments, although not significantly different from the combination of P2L3 treatment and P4L2 and there is a significant influence of the POC concentration factor and the immersion length factor under study, especially on the variable length of shoots at 42 days after planting. Statistically, a better value for all of these variables is achieved by the P3 treatment that is 30% ml / liter of water and the L2 treatment that is 30 minutes.

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